

Fig. 1 of 20

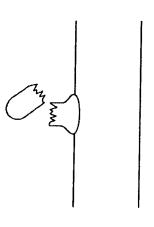


FIG. 1A

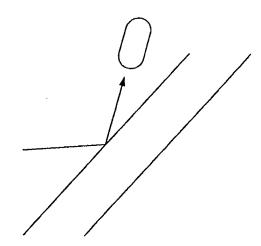


FIG. 1B

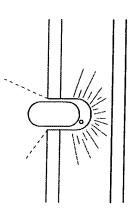


FIG. 1C

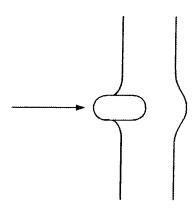


FIG. 1D

Fig. 2 of 20

TEST		TARGE	t :		AREAL DENSITY	FS ^B : B	AREAL FS ^B : Before impact FS: After Penetration	ACT	FS: AFTER	PEN	ETRA	NOL	SPECIFIC ENERGY
¥0.	MATERIAL(S) (YARNS/IN.)	MESH (YARNS/IN.)	THICKNESS NO. OF (G/CM^2) MASS VELOCITY K.E. VELOCITY K.E. VELOCITY $(IN.)$ PLIES (G/CM^2) $(IN.)$ (G/CM^2) $(IN.)$ (G/CM^2) $(IN.)$	NO. OF PLIES	(G/CM ²)	IMASS (G)	VELOCITY (M/S)	K.E.	VELOCITY (M/S)	K.E.	K.E. 1	.0ST (%)	ABSORBED ^C (J/G/CM ²)
20	NOTKZ	30X30	≈0.006	1	0.0130	25	62	82	61.5 47.5 30.5 39	47.5	30.5	39	2346
26	NOTKZ	30X30	≈0.006	1	0.0130	25	82.5	85	63	49.5	49.5 34.5 41	41	2654
23	ZYLON 30X30 UHMW POLYETHYLENE FELT	30X30 THYLENE FELT	≈0.006 ≈0.13		0.0130	25	80	98	35.5 ^F	20 ^F 60	09	75	1366
22	ZYLON 30X30 UHMW POLYETHYLENE FELT	30X30 THYLENE FELT	≈0.006 ≈0.13	1 2	0.0130	25	82	84	DID NOT PENETRATE ^G	7 FG	84	100	>1123

B FS MEANS FRAGMENT SIMULATOR. C SPECIFIC ENERGY ABSORBED (SEA) IS DEFINED AS ENERGY ABSORBED PER UNIT AREAL DENSITY.	SURROUNDED BY THE FELT LAYER, COMPLETELY PENETRATED THE
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G ONLY PARTIAL PENETRATION WAS OBTAINED IN THIS TEST-THE IMPACTOR, SURROUNDED BY THE FELT, REMAINED LODGED IN THE HOLE IN THE FABRIC.

Perkins Coie LLP (650) 838-4300

Title Penetration And Fire Resistant Fabric Materia
And Structures

Serial No.: 09/544,357 I Atty. Dkt. No.: 59501-8028.US01

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1501		IARGEI	<u> </u>		ARFAI	a			FO. AFTE				
AON						FS P: E	FS ": BEFORE IMPACT	PACT	rs: After Penetralion	K FEN	EIKAI		SPECIFIC
≥	MATERIAL(S)	MESH	SSENYOHI	NO. 0F	DEWOILY	NASS	MASSIVEI OCITY WE	W.F.	1/5/ 00/17/	1/1	7 //	100	ENERGY
		(YARNS/IN.)	Q.		(G/CM^2)		(0//0/	į	WELDCIII N.E. A.	7 .f.	.i =	7007	ABSORBED~
12	14011/7	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			(a) om	2	(0/111)	(0)	(c/m)	(م))	<u>@</u>	$(3/G/CM^2)$
3 5		40745	≈0.011	-	0.0219	25	78	9/	29	10.5	65.5	98	0666
190		45X45	≈0.011	2	0.0438	25	113	160	64	515	515 108 5	ł	2477
20	NOTAZ	30X30	900 0≈	-	00130	25	70	2 0	1 2	21,7		- 1	1112
26	NUIX	30730	300 0~		0.0700	3	6/3	0	07.0	47.5		39	2346
3,4	101/12	2000	20.000	,	0.0130	Ş	82.5	85	63	49.5	34.5	41	2654
3	71CUN	くりんくり	≈0.0075	1	0.0158	25	77.5	75	59	435	375	42	9373
5.4	NOTAZ	40X40	≈0.009	1	0.0185	25	70	27	10 F	200			2070
50	NOIX	ANYAN	000 0~	ļ	0.00	3	5	9	43.0	SO.5	40.0	ò	7,077
	7/10/1/	04,704	~0.009	4	0.0740	g	7.9	300	27.5	36.5	36.5 263.5	88	3560
32	717010	40X40	≈0.009	9	0.111	96	6/	300	DID NOT)T_E	300	100	2702
	701/75	00000	0000	,					PENEIRA	1/2			
5	7.77.7	30,430	≈0.006	_	0.0130	25	80	80	25 EF	J^{OG}	09	7.5	
2	UHMW POLYEIHYLENE	E I HYLENE	≈0.13	-	+0.0309					77))	
	TEL!	- 1											
-	NO747	30,230	≈0.006	-	0.0130	25	82	84		,	84	100	
77	UHIMW POLYETHYLENE	EIHYLENE	≈0.13	~	+0.0618	_			חוח חוח	7/		•	
	FELT								PENETRATEG	TEG			

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 $^{ extsf{A}}$ TESTS 13 AND 19 WERE PERFORMED AND REPORTED DURING THE PREVIOUS REPORTING YEAR.

B FRAGMENT SIMULATOR.

^C SPECIFIC ENERGY ABSORBED (SEA) IS DEFINED AS ENERGY ABSORBED PER UNIT AREAL DENSITY.

D DATA FROM THIS TEST ARE QUESTIONABLE DUE TO THE EXCESSIVE PITCH, DEBRIS FROM THE ALUMINUM HONEYCOMB MOMENTUM TRAP TRAVELING AHEAD OF THE IMPACTOR, AND SOME PBO FIBERS FROM THE BACK (22° ORIENTATION) LAYER BREAKING AT THE CORNER OF THE CLAMPING ROD, AND THUS LIKELY REDUCING THE ABSORBED KINETIC ENERGY.

 $^{\it E}$ the impactor penetrated only the first of the six layers.

^F THE IMPACTOR DID NOT PENETRATE THE FELT; HOWEVER, THE IMPACTOR, SURROUNDED BY THE FELT LAYER, COMPLETELY PENETRATED THE FABRIC.

^G ONLY PARTIAL PENETRATION WAS OBTAINED IN THIS TEST-THE IMPACTOR, SURROUNDED BY THE FELT, REMAINED LODGED IN THE HOLE IN THE FABRIC.

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	3	1		\top	T	T	T		T		7	.]
SFA	M2/5/C)	300	782	286	1244	2441	858	2348	758	3350	579	1538
PER BROKEN	YARN	0.07	0.35	0.34	0.29	2.22	0.19	2.26	0.22			
ين	3	5	25	23	20	78	14	75	12	107	6	49
WORK	(IN-1B)	42	<u> </u>	208	174	289	120	H	106	943	81	433
YARNS BROKEN		33+38=71	35+36=71	32+37=69	26+42=68	2+33=35	29+41=70	2+31=33	1+53=54			
MAXIMUM	MODULUS (I B/IN)	742	2545	1778	954	1585	829	1301	1127	1773	974	1475
1	10AD (1.B.)	153	634	484	277	909	214	478	788	587	592	532
1ST YARN BREAK FAILURE	ON HUKE (IN.)	0.757	1.035	1.023	1.330	≈2.70	1.232	æ2.70	1.051	=3.4	0.767	>2.2
IBREAK	10AD (B)	153	493	400	260	398	214	463	288	388	240	377?
1ST YARA	STROKE (IN.)	0.488	0.697	0.672	0.687	0.781	0.612	0.834	0.667	0.764	0.572	0.792?
DATA	(MS)	10	10	10	10	10	10	10	10	10	10	10
STROKE		0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.0378	0.075	0.075
PENETRATOR	ORIENTATION	45°	$45^{\circ} 0.0$	45° DENSITY	45°	45° DENSITY =	45°	45° 0.0 L DENSITY = 0.0318		OENSITY =	0	$\begin{array}{c c} 25-G FS-SH & 0^{\circ} & 0.07\\ \hline TOTAL AREAL DENSITY = 0.0318 \end{array}$
PENET	TYPEB	29-G FB	29-G FB TOTAL ARFAL	29-G FB TOTAL AREAL	29-G FB	29-G FB TOTAL AREAL	вэ азамлов	O ROUNDED FB	29-G FB	29-G FB TOTAL AREAL	25-G FS-SH	25-G FS-SH TOTAL AREA
NO. DENSITY GRIPPED EDGESA	(G/CM^2) NO. YARNS: (IN.)	4 W&F 5.0	4 W&F 5.0 NOT GRIPPED	0.0158 4 W&F 5.0 0.0080 NOT GRIPPED	2 F 5.0	2 F 5.0 NOT GRIPPED	2 F 5.0	F 5 VOT GRIPPED	2 F 5.0	2 F 5.0 NOT GRIPPED	2 F 5.0	2 F 5.0 NOT GRIPPED
AREAL DENSITY	(G/CM ²)	0.0158 4	0.0158	0.0158 0.0080	0.0158	0.0158 2 0.0160 A	0.0158 2	0.0158 2	0.0158 2	0.0158 2	0.0158 2	0.0158 2 0.0160 A
, NO.	rues	1	2	1	-	7 2	1	1 2	1	1	1	2 م
IARGET MATERIAL FABRIC TYPE	(7.11)	4/23 ZYLON 35X35 WEAVE	4/23 ZYLON 35X35 WEAVE ZYLON FELT #2	4/28 ZYLON 35X35 WEAVE ZYLON FELT #2	ZYLON 35X35 WEAVE	ZYLON 35X35 WEAVE ZYLON FELT #2	5/7 ZYLON 35X35 WEAVE	5/7 ZYLON 35X35 WEAVE ZYLON FELT #2	ZYLON 35X35 WEAVE	5/14 ZYLON 35X35 WEAVE ZYLON FELT #2	5/20 ZYLON 35X35 WEAVE	5/20 ZYLON 35X35 WEAVE ZYLON FELT #2
	(1998)	4/23 2	4/23 2	4/28 Z	4/29 2	4/30 2	2/2	5/7 Z	5/13	5/14 2	5/20	5/20 Z
TEST VIDEO DATE		>	>	>	>	>	>	>	>	>	>	>
TEST		P-22	P-23	P-26	P-28	P-29	P-30	P-31	P-35	P-36	P-37	P-38

A W=WARP YARNS; F=FILL YARNS.

 B FS=FRAGMENT SIMULATOR; FB=FAN BLADE

^C THE ANGLE BETWEEN THE DIRECTION OF THE WARP YARNS AND THE LONGEST DIMENSION OF THE PENETRATOR'S IMPACT END (e.g, THE BLADE DIRECTION).

D TESTS INVOLVE CONSTANT STROKE RATE TO COMPLETE PENETRATION, EXCEPT WHERE MARKED "C"(CYCLICAL LOADING) OR "I "(INTERRUPTED BEFORE FULL PENETRATION)

E DATA IS FOR COMPLETE PENETRATION, EXCEPT FOR INTERRUPTED TESTS (MARKED "1"), WHERE DATA IS AT MAXIMUM BEFORE INTERRUPTION.

 $^{\it F}$ equals the area under the load-deflection charge

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Perkins Coie LLP (650) 838-4300 Title Penetration And Fire Resistant Fabric Materia And Structures Serial No.: 09/544,357 Filed: 04/06/2000 Atty. Dkt. No.: 59501-8028.US01 Fig. 5 of 20 Load (N) 300 - 200 100 2.5 \sim 0.6 Stroke (in.) Stroke (cm) (P23) Two Plies PBO Felt (Ungripped): 25 J Absorbed (SEA = $782 J/g/cm^2$) (P26) One Ply PBO Felt (Ungripped): 23 J Absorbed (SEA = 987 J/g/cm^2) (P22) Nothing: $5 J Absorbed (SEA = 300 J/g/cm^2)$

009

500

400

(qı) peo7

200

100

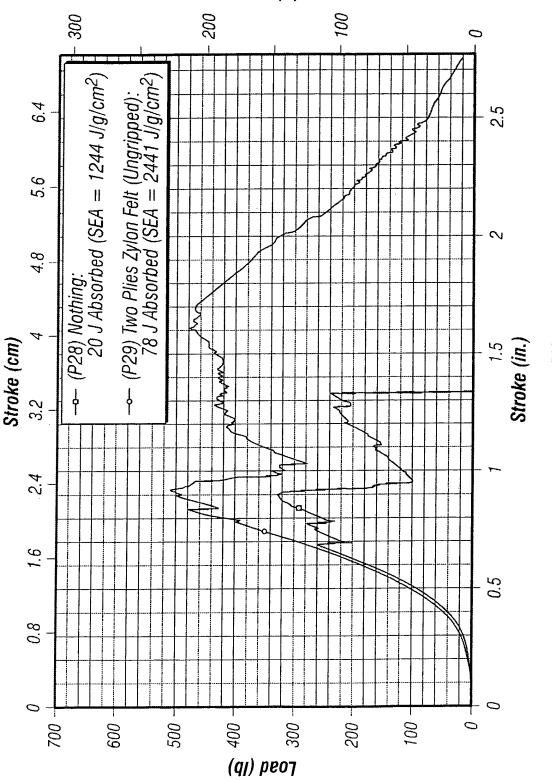
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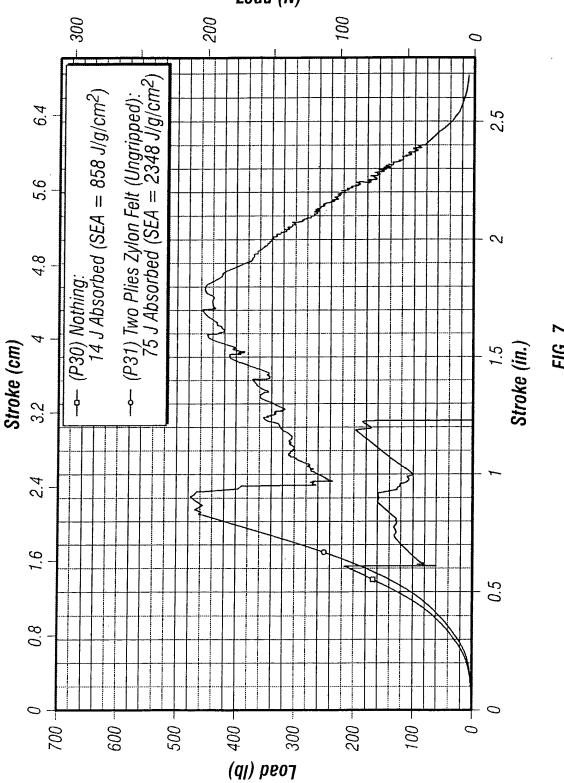


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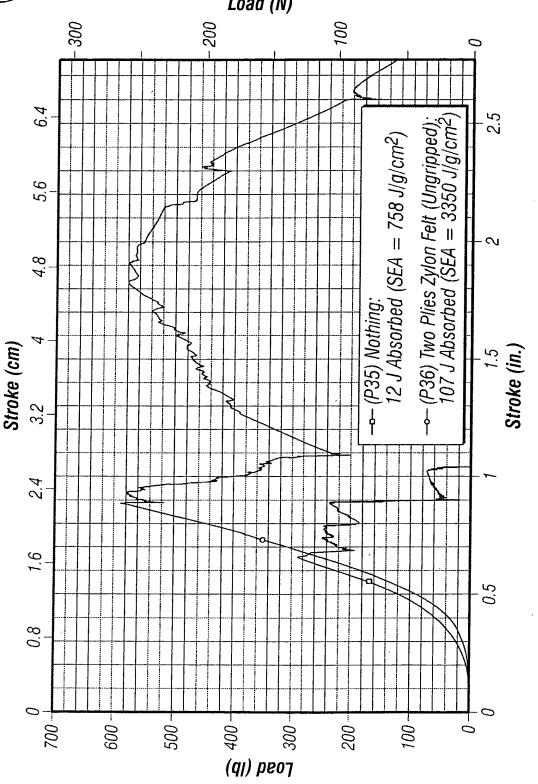




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F/G. 8



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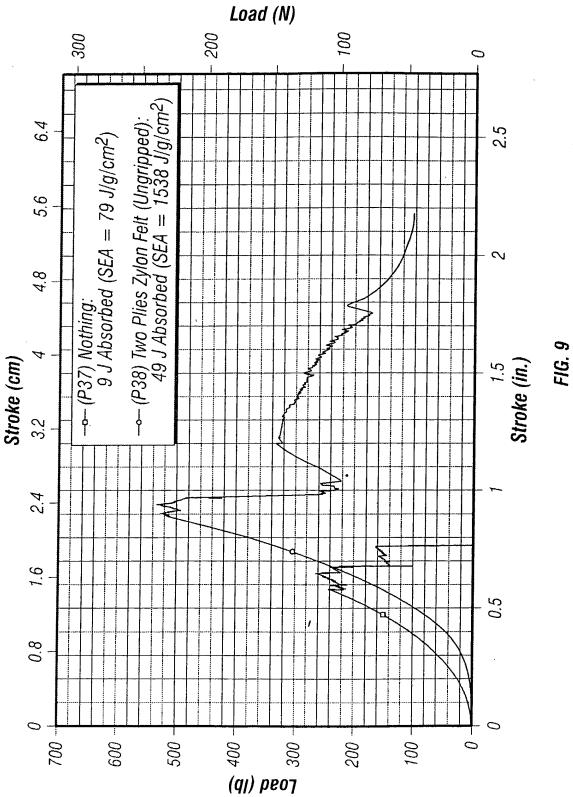




Fig. 10 of 20

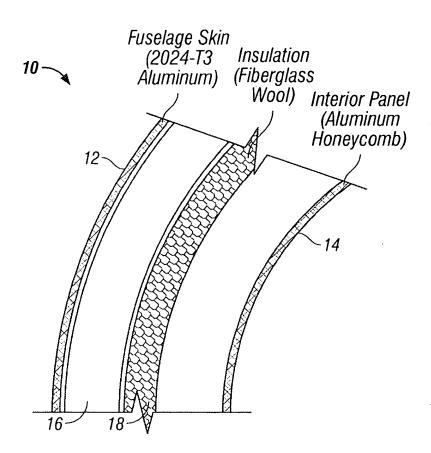


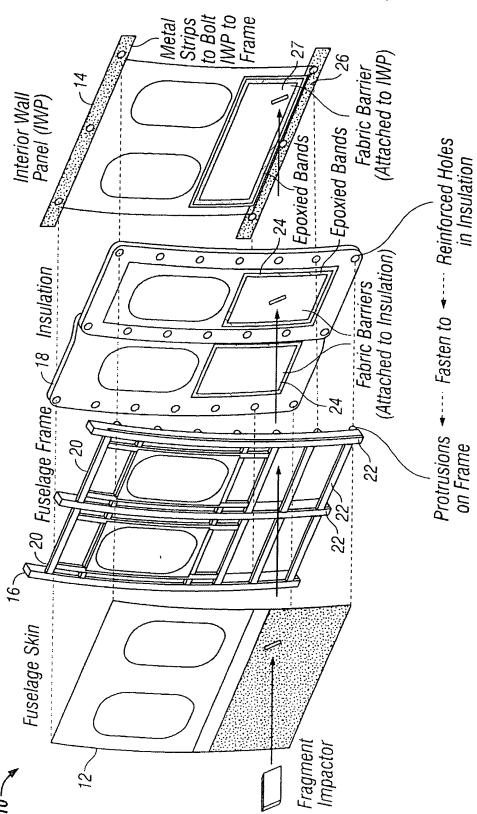
FIG. 10



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F/G. 11



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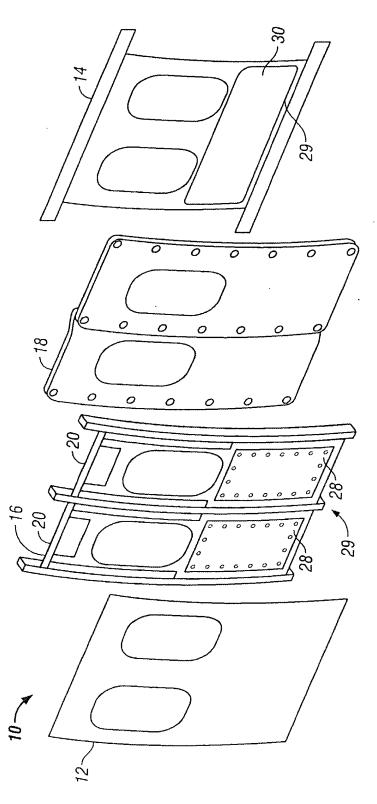




Fig. 13 of 20

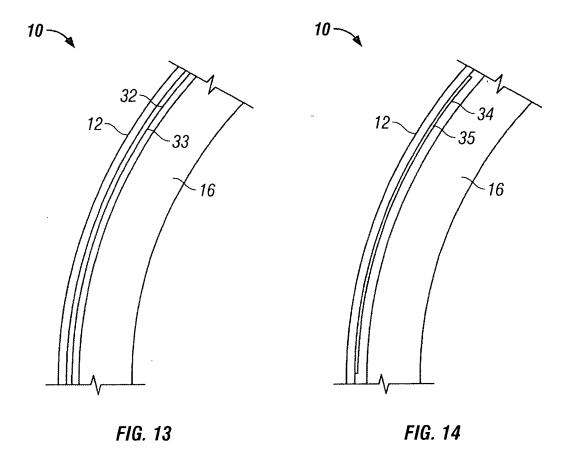




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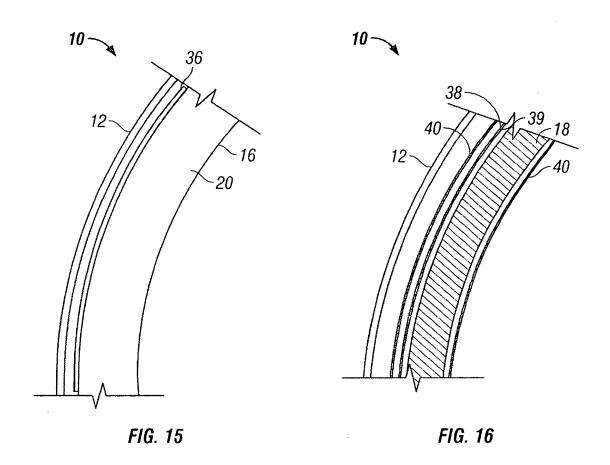




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10-

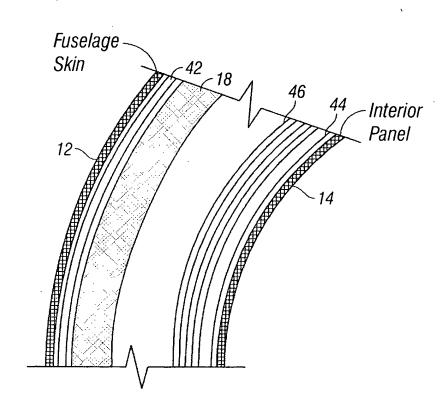


FIG. 17



Fig. 16 of 20

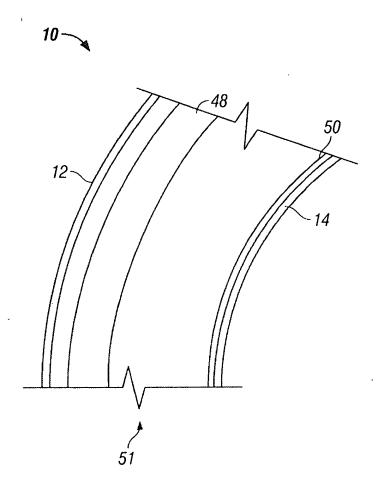


FIG. 18



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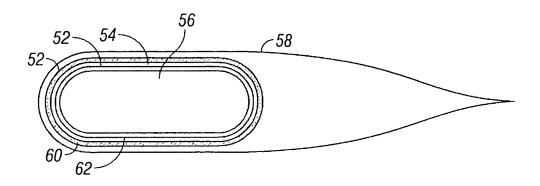


FIG. 19

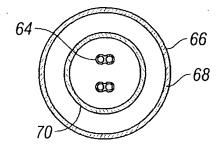


FIG. 20



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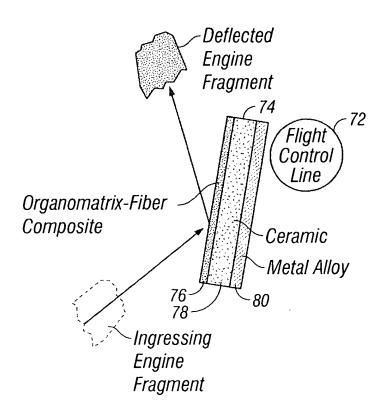
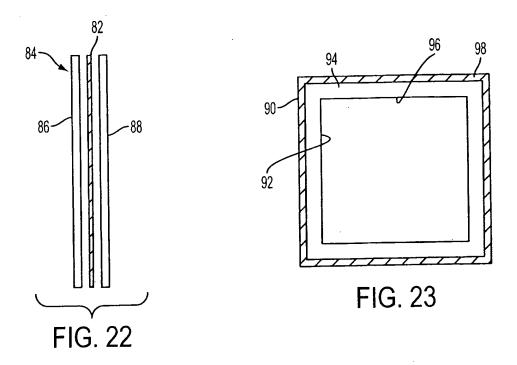


FIG. 21



Fig. 19 of 20



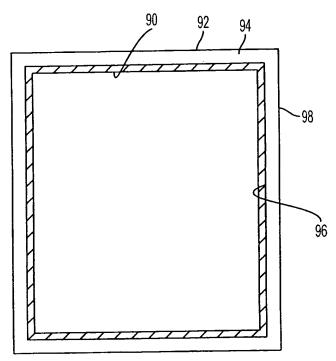


FIG. 24



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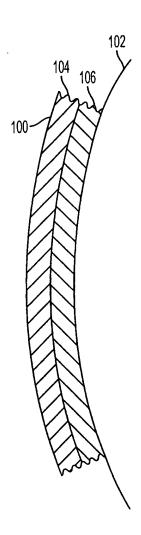


FIG. 25